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## FACSIMILE COVER SHEET

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DATE: October 20, 2006

TO: Examiner Edward M. Johnson  
Group Art Unit 1754

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Applicant: Horne et al.  
Due Date: November 2, 2006

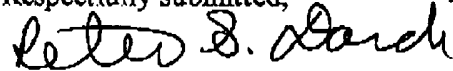
OUR REF.: 3132.07US02

FROM: Peter S. Dardi, Ph.D.  
PHONE #: 404-949-5730

Attached is the following for filing in the above-identified application.

- (1) Appeal Brief Transmittal; and
- (2) Appeal Brief.

Respectfully submitted,

Peter S. Dardi, Ph.D.  
Registration No. 39,650

## CERTIFICATE OF FACSIMILE TRANSMISSION

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October 20, 2006  
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Attorney Docket No. 3132.07US02

APPEAL BRIEF TRANSMITTAL

In re the application of:

Horne et al.

Confirmation No.: 3132.07US02

Application No.: 09/757,519

Examiner: Johnson, Edward M.

Filed: January 9, 2001

Group Art Unit: 1754

For: METAL VANADIUM OXIDE PARTICLES,

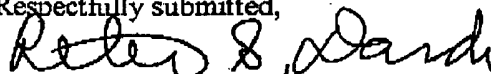
Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Transmitted herewith, is the Appeal Brief in the above-identified application, with respect to the Notification of Non-Complaint Appeal Brief filed on September 20, 2006.

Applicants previously paid \$250 for the filing of an Appeal Brief in this matter on August 20, 2003. Applicants believe that no additional fees are due, but please charge the below deposit account if that assessment is in error to ensure entry of this Brief.

Respectfully submitted,



Peter S. Dardi, Ph.D.

Registration No. 39,650

*Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 50-3863.*

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October 20, 2006  
Date

Peter S. Dardi  
Peter S. Dardi, Ph.D.

OCT 20 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Attorney Docket No.: 3132.07US02

Horne et al.

Confirmation No.: 8679

Application No.: 09/757,519

Examiner: Edward M. Johnson

Filed: January 9, 2001

Group Art Unit: 1754

For: METAL VANADIUM OXIDE PARTICLES

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

BRIEF FOR APPELLANT

OCT 20 2006

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Application No. 09/969,025

PATENT APPLICATION  
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Attorney Docket No.: 3132.07US02

Horne et al.

Confirmation No.: 8679

Application No.: 09/757,519

Examiner: Edward M. Johnson

Filed: January 9, 2001

Group Art Unit: 1754

For: METAL VANADIUM OXIDE PARTICLES

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES  
CORRECTED APPEAL BRIEFMail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This is an appeal from an Office Action dated January 27, 2003, in which claims 1-3, 6-10, 17 and 22-26 were finally rejected. The rejection of claims 1-3, 6-10, 17 and 22-26 are hereby appealed. A Notice of Appeal was filed on June 23, 2003. An Appeal Brief was filed on August 20, 2003. A Notice of Non-Compliant Amendment was mailed on August 22, 2006 and a second Notice of Non-Compliant Amendment was mailed on October 2, 2006. This Corrected Appeal Brief is timely filed in response to the Notice of Non-Compliant Brief of October 2, 2006.

*Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 50-3863.*

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October 20, 2006  
Date

Peter S. Dardi  
Peter S. Dardi, Ph.D.

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Application No. 09/969,025

**REAL PARTY IN INTEREST**

Greatbatch, Inc. (previously known as Wilson Greatbatch Technologies, Inc.), has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefore. Greatbatch was assigned the patent application by NanoGram Corporation, a corporation organized under the laws of the state of Delaware, and having offices at 165 Topaz St., Milpitas, California. On June 17, 2004, an assignment was executed transferring ownership from NanoGram Corporation to Wilson Greatbatch Technologies, Inc., although NanoGram Corp. may have retained certain licensed rights, recorded at reel 015552, frame 0199. The rights in the patent application were transferred to NanoGram Corp. as per the Assignment, recorded at Reel 011451, Frame 0570 from the inventors to NeoPhotonics Corporation and an assignment from NeoPhotonics Corporation to NanoGram Corporation recorded at Reel 013957, Frame 0076. Note that NeoPhotonics Corporation was formerly called NanoGram Corporation, and the present NanoGram Corporation is an independent corporation spun out from NeoPhotonics Corp.

**RELATED APPEALS AND INTERFERENCES**

Pending U.S. Patent application 09/606,884 was appealed to the USPTO Board of Patent Appeals and Interferences. This patent application is assigned to NanoGram Corporation. A copy of the decision is attached. It is noted that the decision reversed the rejection.

**STATUS OF CLAIMS**

Claims 1-3, 6-18 and 22-26 are pending, and claims 4, 5 and 19-21 have been canceled. Claims 1-3, 6-10, 17 and 22-26 stand rejected. Claims 11-16 and 18 are free of any rejections and are objected to for depending on a rejected base claim. The appealed claims are listed in the Claims Appendix.

### **STATUS OF AMENDMENTS**

All Amendments have been entered with the filing of the Appeal.

### **SUMMARY OF CLAIMED SUBJECT MATTER**

The invention relates to powders, i.e., collections of particles, having a composition of a metal vanadium oxide. (See, for example, the abstract.) Metal vanadium oxides have a non-vanadium metal ion along with a vanadium ion within an oxide composition. (Specification, for example, page 4, lines 10-23.) The claimed composite metal oxide particles have an average particle size less than a micron. (Specification, for example, page 5, lines 1-18.)

Any particular powder has particles that can be characterized by size. A collection of particles has an average particle size and a distribution of particle sizes, which are related but separate properties. The distribution of particle sizes relate to the size uniformity of the particles. Some of the pending claims specify particular distributions corresponding to highly uniform particles. (Specification, for example, page 31, lines 3-26. Claim group 4.) All of the claims directed to particle collections have a submicron average particle size. (Specification, for example, page 30, lines 1-19. Independent claim 1. Claim group 1.) In some embodiments, the particles have an average particle size from about 5 nm to about 100 nm (claim group 2), and in further embodiments, the particles have an average particle size from about 5 nm to about 50 nm (claim group 3). (Specification, for example, page 30, lines 1-19.)

Some of the pending claims relate to methods for forming metal vanadium oxide particles. (Independent claim 10. Claim group 5.) In the claimed methods, the metal vanadium oxide particles are formed by heating a mixture of vanadium oxide particles with a non-vanadium metal compound. (Specification, for example, page 26, line 29 to page 27, line 10.) The reactant vanadium oxide particles have an average particle size less than a micron. (Specification, for

example, page 27, lines 11-22.) Applicants' specification describes the formation of submicron vanadium oxide particles using a process called laser pyrolysis. (Specification, for example, page 4, lines 26-33 and Example 1). Through the description of the laser pyrolysis approach, Applicants' specification enables the formation of the starting materials for the formation of submicron metal vanadium oxide materials. (Specification, for example, Example 4.) The present application does not claim the formation of particles with laser pyrolysis.

Additional claims are directed to batteries formed with submicron metal vanadium oxide particles. (Independent claim 17. Claim group 1.) In particular, metal vanadium oxide particles are useful as cathode materials, especially for lithium-based batteries. (Specification, for example, Example 10.) The submicron character of the metal vanadium oxide particles can contribute improved performance in battery applications. (Specification, for example, Example 10.)

#### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

- A. The rejection of claims 1-3, 6-9, 17 and 22-26 as unpatentable under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 5,549,880 to Koksang.
- B. The rejection of claim 10 as unpatentable under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 5,512,214 to Koksang?

#### **ARGUMENT**

The following argument is organized around the following grouping of claims, which is summarized for the convenience of the Board.

1. Claims 1, 17, 22, 24 and 26 are within a first claim group directed to a collection of metal vanadium oxide particles or batteries formed with metal vanadium oxide particles with the particles having a specified average particles size.
2. Claim 2 is in a second claim group directed to a collection of metal vanadium oxide particles with an average diameter from about 5 nm to about 100 nm.
3. Claim 3 is in a third claim group directed to a collection of metal vanadium oxide particles with an average diameter from about 5 nm to about 50 nm.
4. Claims 6-9 and 23 are within a forth claim group directed to a collection of metal vanadium oxide particles or batteries formed with metal vanadium oxide particles with the particles having a specified average particles size and a specified particle size uniformity.
5. Claims 10 and 25 are within a fifth claim group directed to a method for producing metal vanadium oxide particles using vanadium oxide particles with a specified average particle size range.

#### LEGAL AUTHORITY

The Court of Appeals for the Federal Circuit has exclusive appellate jurisdiction for cases arising under the patent law under 28 U.S.C. § 1295 (a)(1). The Federal Circuit has adopted as binding precedent all holding of its predecessor courts, the U.S. Court of Claims and the U.S. Court of Customs and Patent Appeals. South Corp. v. U.S., 215 USPQ 657 (Fed. Cir. 1982). Therefore, unless they have been overruled en banc, CCPA cases are binding precedent for the present appeal.



## A. ANTICIPATION

### 1. A Single Reference Must Disclose Every Element Set Forth In a Claim To Anticipate The Claim

"For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference. **These elements must be arranged as in the claim under review**, but this is not an 'ipsissimis verbis' test." In re Bond, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990)(Internal citations omitted and emphasis added.).

"If the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if that element is 'inherent' in its disclosure. To establish inherency, the intrinsic evidence 'must make it clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 49 USPQ2d 1949, 1950, 1951 (Fed. Cir. 1999), citing Continental Can Co. v. Monsanto Co., 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

"Every element of the claimed invention must be literally present, arranged as in the claim. **The identical invention must be shown in as complete detail as is contained in the patent claim.**" Richardson v. U.S. Suzuki Motor Corp., 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)(Internal citations omitted, and emphasis added.); see also MPEP 2131. "Here, as well, anticipation is not shown by a prior art disclosure which is only 'substantially the same' as the claimed invention." Jamesbury Corp. v. Litton Industrial Products, Inc., 225 USPQ 253, 256 (Fed. Cir. 1985)(emphasis added).

### 2. Ranges

Claims covering a range of composition narrower than a broader range covered in the prior art are not anticipated, although they may be obvious over the prior art. In re Malagari, 182 USPQ 549, 553 (CCPA 1974). Such claims are analogous to the claim of a species or subgenus within a genus, which may be patentable and generally are not obvious. See MPEP 2131.02 and 2131.03.

## B. OBVIOUSNESS

### 1. The Examiner Bears The Burden Of Demonstrating Obviousness.

The Applicants note that the patent office has the burden of persuasion in showing that the Applicants are not entitled to a patent. "[T]he conclusion of obviousness vel non is based on the preponderance of evidence and argument in the record." In re Oetiker, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The patent office has the ultimate burden of persuasion in establishing that an applicant is not entitled to a patent. Id. at 1447, concurring opinion of Judge Plager. "The only determinative issue is whether the record as a whole supports the legal conclusion that the invention would have been obvious." Id.

"In rejecting claims under 35 U.S.C. §103, the examiner bears the initial burden of presenting a prima facie case of obviousness." In re Rijckaert, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). If the Examiner fails to establish a prima facie case of obviousness, the obviousness rejection must be withdrawn as a matter of law. In re Ochiai, 37 USPQ at 1131 ("When the references cited by the examiner fail to establish a prima facie case of obviousness, the rejection is improper and will be overturned"). "If examination at the initial stage does not produce prima facie case of unpatentability, then without more the applicant is entitled to grant of the patent." In re Oetiker, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

"Only if that burden is met, does the burden of coming forward with evidence or argument shift to the applicant." In re Rijckaert, 28 USPQ2d at 1956. "After evidence or argument is submitted by the applicant in response to an obviousness rejection, patentability is determined on

the totality of the record, by a preponderance of the evidence with due consideration to persuasiveness of the argument." In re Chu, 36 USPQ2d 1089, 1094 (Fed. Cir. 1995)(quoting In re Oetiker, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992)).

## 2. The References Must Teach Or Suggest All Of The Claim Elements

Prima facie obviousness is not established if all the elements of the rejected claim are not disclosed or suggested in the cited art. In re Ochiai, 37 USPQ 1127, 1131 (Fed. Cir. 1995). ("The test for obviousness *vel non* is statutory. It requires that one compare the claim's 'subject matter as a whole' with the prior art 'to which said subject matter pertains.'"). See also, MPEP 2143.03 "All Claim Limitations Must Be Taught or Suggested," citing In re Royka, 180 USPQ 580 (CCPA 1974). "To establish prima facie obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art." MPEP 2143.03.

To establish prima facie obviousness, all the elements of the claim must be taught or suggested by the cited references without the benefit of hindsight based on the applicant's own disclosure. "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a **hindsight syndrome** wherein that which only the inventor taught is used against its teacher." W. L. Gore & Assocs., Inc. v. Garlock, Inc., 220 USPQ 303, 312-13 (Fed. Cir. 1983). "Skill in the art does not act as a bridge over gaps in the substantive presentation of an obviousness case, but instead supplies the primary guarantee of objectivity in the process." All-Site Corp. v. VSI International Inc., 50 USPQ2d 1161, 1171 (Fed. Cir. 1999).

## 3. The Claimed Recited Properties Of The Claimed Compositions Of Matter Are Claim Elements

It is long established that a composition of matter is indistinguishable from its properties. In re Papesch, 137 USPQ 43, 51 (CCPA 1963); In re Cescon, 177 USPQ 264, 266 (CCPA 1973). There are two types of properties, chemical/compositional properties and physical properties. The chemical/compositional properties of the composition of matter determine what the material is, while the physical properties relate to the interaction and behavior of the composition of matter. Often unique or unexpected physical properties are used to establish the existence of an unobvious composition when chemical/compositional properties either are unknown or do not fully represent the unobviousness of the composition. However, discovery of a surprising or unexpected physical property does not necessarily control an obviousness determination, and all the evidence under the Graham factors must be considered. See, for example, Richardson-Vicks v. Upjohn Co., 44 USPQ2d 1181, 1187 (Fed. Cir. 1997). **In the present case, the claims do not relate to the discovery of properties of previously known or suggested materials.**

Obviousness under 35 U.S.C. §103 must be evaluated by viewing the invention as a whole. In re Langer, 175 USPQ 169, 171 (CCPA 1972). "In effect, we consider the prior art 'as a whole' with the claimed subject matter 'as a whole.'" Id. This rule superseded other principles, and specifically, "homology should not be automatically equated with prima facie obviousness." Id. (emphasis added). "To give meaning to the language of 35 U.S.C. 103 which speaks to the subject matter 'as a whole,' we feel weight must be given the properties of a compound or composition of matter." In re Murch, 175 USPQ 89, 92 (CCPA 1972)(emphasis added).

The present claims are directed to compositions of matter or method for manipulating compositions of matter. Certain claimed aspects of the present invention are chemical/compositional properties that make the material a different composition of matter. In particular, Applicants' **claimed compositions** have several compositional features of particular relevance. First, the composition of matter comprises particles with specified properties. Specifically, the particles have a specified range of average particle sizes. Average particle size is a

chemical/compositional property similar to chemical formula or molecular weight of a polymer. Collections of particles with one average particle size are a different composition of matter and will have different physical properties from collections of particles with other average particle sizes.

Similarly, the distribution of particle sizes is another independent chemical/composition property of solid particles that is **distinct** from the average particle size. **A particle collection with a particular particle size distribution is a different composition of matter and will have different physical properties from other collections of particles with different particle size distributions.** Applicants have developed an approach using light/radiation-based pyrolysis to produce the highly uniform powders/particles, which is the subject of some of the present claims. These highly uniform particles can be further reacted to form other product particles with desirable properties. A particle collection with a narrow particle size distribution is more uniform.

4. To Support A Finding Of Obviousness Based On Cited Art, The Cited Art Must Provide A Means Of Obtaining The Claimed Composition Or Apparatus

The proposition is well established that the cited art only renders a composition of matter or apparatus unpatentable to the extent that the cited art enables the disputed claims, in other words, if the cited art provides a means of obtaining the claimed composition or apparatus.

To the extent that anyone may draw an inference from the Von Bramer case that the mere printed conception or the mere printed contemplation which constitutes the designation of a 'compound' is sufficient to show that such a compound is old, regardless of whether the compound is involved in a 35 U.S.C. 102 or 35 U.S.C. 103 rejection, we totally disagree. ... We think, rather, that the true test of any prior art relied upon to show or suggest that a chemical compound is old, is whether the prior art is such as to place the disclosed 'compound' in the possession of the public. In re Brown, 141 USPQ 245, 248-49 (CCPA 1964)(emphasis in original)(citations omitted).

Similarly, see In re Hoeksema, 158 USPQ 596, 600 (CCPA 1968)(emphasis in original):

We are certain, however, that the invention as a whole is the claimed compound and a way to produce it, wherefore appellant's argument has substance. There has been no showing by the Patent Office in this record that the claimed compound can exist because there is no showing of a known or obvious way to manufacture it; hence, it seems to us that the 'invention as a whole,' which section 103 demands that we consider, is not obvious from the prior art of record.

While there are valid reasons based on public policy as to why this defect in the prior art precludes a finding of obviousness under section 103. *In re Brown*, supra, its immediate significance in the present inquiry is that it poses yet another difference between the claimed invention and the prior art which must be considered in the context of section 103. So considered, we think the differences between appellant's invention as a whole and the prior art are such that the claimed invention would not be obvious within the contemplation of 35 U.S.C. 103.

The Federal Circuit has further emphasized these issues. "But to be prior art under section 102(b), a reference must be enabling. That is, it must put the claimed invention in the hands of one skilled in the art." *In re Sun*, 31 USPQ2d 1451, 1453 (Fed. Cir. 1993)(unpublished). Assertions in a prior art reference do not support an anticipation or obviousness rejection unless the references place the claimed invention in the hands of the public. *Beckman Instruments Inc. v. LKB Produkter AB*, 13 USPQ2d 1301, 1304 (Fed. Cir. 1989). "In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method." *Id.* While a properly citable reference is prior art for all that it teaches, references along with the knowledge of a person of ordinary skill in the art must be enabling to place the invention in the hands of the public. *In re Paulsen*, 31 USPQ2d 1671, 1675 (Fed. Cir. 1994). See also *In re Donohue*, 226 USPQ 619, 621 (Fed. Cir. 1985).

#### 5. Obviousness Over A Single Prior Art Reference

The importance of the principle that the prior art itself must suggest the motivation to modify the teachings of a reference was eloquently stated in *In re Rouffet*, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998)(emphasis added):

The Board did not, however, explain what specific understanding or technical principle within the knowledge of one of ordinary skill in the art would have suggested the combination. Instead the board merely invoked the high level of skill in the field of the art. If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance. Instead, in complex scientific fields, the Board could routinely identify the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Similar principles must be applied when obviousness is based on the teachings of a single cited reference.

In appropriate circumstances, a single prior art reference can render a claim obvious. However, there must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion. This suggestion or motivation may be derived from the prior art reference itself, from the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. Determining whether there is a suggestion or motivation to modify a prior art reference is one aspect of determining the scope and content of the prior art, a fact question subsidiary to the ultimate conclusion of obviousness.

Sibia Neurosciences, Inc. v. Cadus Pharmaceutical Corp., 55 USPQ2d 1927, 1931 (Fed. Circuit 2000)(internal citations omitted, emphasis added).

#### ANALYSIS

##### A. REJECTION OVER KOKSBANG '880 - First Ground of Rejection

The Examiner rejected claims 1-3, 6-9, 17 and 22-26 under 35 U.S.C. § 102(b), as anticipated by U.S. Patent 5,549,880 to Koksbang (the Koksbang '880 patent). The Examiner has failed to establish a prima facie case of anticipation. Furthermore, in phone interviews, the Examiner has raised issues relating to obviousness that have not been raised in written Office Actions. The implication from these discussions was that the Patent Office is operating on the

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Application No. 09/969,025

incorrect basis that Applicants have the burden to establish patentability. The Examiner has not asserted a prima facie case of obviousness. These issues are analyzed in detail in the following.

Also, Applicants note that it seems to have been an error to include claim 25 in this rejection since claim 25 depends from claim 10, which was not rejected over the Koksbang '880 patent. Applicants respectfully request clarification of the status of claim 25. To the extent that claim 25 is rejected over Koksbang '214 patent, the patentability of claim 25 is argued below with respect to claim 10 since the arguments apply equally with claim 25.

#### Group 1 Claims

The Patent Office has the burden to establish prima facie unpatentability. The rejection formally presented by the Examiner is based on anticipation. Since the Examiner has raised issued in phone interviews based on obviousness, both anticipation and obviousness are discussed separately below.

The Koksbang '880 patent does not prima facie anticipate Applicants' claimed invention. Specifically, pending claim 1 specifies that the average particle size for the claimed collection of metal vanadium oxide particles is less than a micron. The Koksbang '880 patent does not disclose metal vanadium oxide particles with an average particle size less than a micron either **explicitly or inherently**. The Koksbang '880 patent describes a lithium vanadium oxide, which is a species of metal vanadium oxides, "in the form of a fine powder having a surprisingly small particle size on the order of 0.1 to 5 microns, and typically less than 10 microns." Column 2, lines 59-61. The Koksbang patent **does not identically disclose** the composition of Applicants' invention since the Koksbang patent does not expressly recite that the particle size range disclosed is a range of average particle sizes.

Furthermore, it is clear in context that this description of particle sizes is not a description of average particle sizes. In particular, the inclusion of the description of "typically less than 10 microns" is inconsistent with 0.1 to 5 microns being a range of averages. If 0.1 to 5 microns relates



to a particular distribution of particle sizes, there is some cut off in the distribution that is used to assign the end points presented. This can be picked, for example, at one standard deviation. Thus, there would be some particles with sizes larger than 5 microns and smaller than 0.1 microns. To then indicate that the particle sizes are typically less than 10 microns would imply that a more stringent criterion is being used to indicate "typically," for example, 90 percent or 95 percent of the particles. This interpretation is perfectly consistent although not explained in the Koksbang patent. So if the "0.1 to 5 microns" is a distribution, the expression "typically less than 10 microns" is not inconsistent. However, if "0.1 to 5 microns" refers to average particle sizes, the expression "typically less than 10 microns" is inconsistent since a description clearly relating to the distribution would then be contrasted with averages without explanation. Since there is no explicit explanation otherwise, the consistent reading of the language in the Koksbang '880 patent is that all values relate to the distribution of particle sizes.

In addition, the Koksbang '880 patent has a single example directed to the production of lithium vanadium oxide. A single set of reaction conditions are described for the production of the lithium vanadium oxide from column 4, line 49 to 67. "The product was found to have a surprisingly small particle size on the order of 0.1 to 5 microns, and typically less than 10 microns." Column 5, lines 4-6. A powder product has a single average particle size and a single particle size distribution relating to the characteristics of the particles within the powder. Since the quoted language was used to describe a single product, it must be referring to a single distribution of particle sizes that would have a corresponding a single average particle size, not a range of average particle sizes. Based on a single example with one set of reaction conditions, the only consistent interpretation of the language in the Koksbang '880 patent is that 0.1 to 5 microns refers to a single distribution with an average particle size of roughly 2.5 microns. Since the single set of particle properties disclosed in the Koksbang '880 patent have an average particle size significantly greater than the claimed particle size, the Koksbang '880 patent does

not explicitly disclose a collection of metal vanadium oxide particles with an average particle size less than one micron.

Similarly, the Koksbang '880 patent does not inherently disclose metal vanadium oxide particles with an average particle size less than one micron. Specifically, the Koksbang patent explicitly discloses the particle size of the metal vanadium oxide particles. There are no particle collections in the Koksbang '880 patent with inherent size properties that are not described, so there cannot be inherent disclosure relating to average particle sizes. Since the Koksbang '880 patent does not explicitly or inherently disclose metal vanadium oxide particles with an average particle size less than a micron, the Koksbang '880 patent does not anticipate Applicants' claimed invention.

With respect to obviousness, the Examiner has clearly not stated a prima facie case for obviousness. It is simply not the Applicants' burden to establish patentability. With respect to the Examiner's assertions regarding the possible formation of Applicants' claimed particle from the particles formed by the process of the Koksbang '880 patent, this can only be relevant to an obviousness analysis. However, the Koksbang '880 patent does not teach or suggest any separation techniques. Under well established legal principles, the modification of the teachings of a reference can only be based upon the teachings of another reference or what is well known to a person of ordinary skill in the art. The Examiner has not asserted that appropriate teaching is well known in the art or provided a reference that describes appropriate knowledge being well known in the art. If it was well known to a person of ordinary skill in the art how to form the claimed particle collections from the particle collections described in the Koksbang '880 patent, it should be possible for the Examiner to provide such a reference. Similarly, the Examiner has not asserted or implied in the phone conferences that he has personal knowledge that appropriate approaches are known in the art for performing the requires submicron particle separation.

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Cited references must teach all of the claim elements. Specifically, the cited art must place the invention in the hands of the public to support an obviousness or anticipation rejection. The Koksbang '880 patent simply does not put the invention in the hands of the public. Certainly, with respect to Applicants' claimed invention, the Examiner has fallen far short of meeting his burden of establishing prima facie anticipation or obviousness.

The Examiner's implied assertion that Applicants must provide evidence of more with respect to showing that there is no other way of making Applicants' claimed invention is a shifting of burdens contrary to the law. Applicants simply do not as a matter of law have the burden to prove patentability. If a person of ordinary skill in the art could practice the claimed invention without undue experimentation based on the disclosure in the Koksbang '880 patent, the Examiner should easily be able to support that assertion with some kind of evidence. The Examiner has presented no evidence to support an obviousness rejection over the Koksbang '880 patent.

Since the Examiner has fallen short of establishing prima facie unpatentability of Applicants' claimed invention, the rejection should be withdrawn.

#### Group 2 Claim

The claims of group 2 relate to collections of metal vanadium oxide particles with an average particle size from 5 nm (0.005 microns) to 100 nm (0.1 microns). The Examiner has not clearly indicated in any Office Action how this claim is anticipated by the teachings of the Koksbang '880 patent. Therefore, the Examiner has failed to establish prima facie anticipation of this claim.

Group 3 Claim

The claim of group 3 relate to collections of metal vanadium oxide particles with an average particle size from 5 nm (0.005 microns) to 50 nm (0.05 microns). The Examiner has not indicated in any Office Action how this claim can possibly be anticipated by the Koksbang '880 patent since there is no description whatsoever of particles this small in the Koksbang '880 patent. Thus, the Examiner has clearly failed to assert prima facie anticipation of the Group 3 claim.

Group 4 Claims

Group 4 claims include additional features relating to the uniformity of the particles with respect to size. Specifically, the particle size distributions are narrow as specified in the claims. With respect to these claims, the Examiner asserted that these uniformity features were inherent in the Koksbang '880 particles since the Koksbang '880 patent teaches the same process. See the Office Action of January 27, 2003 at page 3. This simply is not the case. The Koksbang patent throughout teaches a solution based reaction. In contrast, Applicants method involved forming a vanadium oxide reactant that is formed in a flow with the reaction driven by an intense light source. The vanadium oxide reactant is converted into the metal vanadium oxide in a solid state reaction. Since the cited reference does not teach or suggest the same methodology as Applicants' disclosure, the Examiner has clearly failed to assert a prima facie case of anticipation of the claims of group 4.

When Applicants previously pointed out that the methods were not the same, the Examiner asserted that the claims did not specify a method. But with all due respect, the Examiner's comment is irrelevant. Applicants described their method only to refute the Examiner's assertions that the method was the same as the Koksbang '880 method and not to assert that Applicants' were relying on their process for patentability. The legal standards for

establishing anticipation by inherency of a claimed composition of matter stipulate that the compositions in the cited references must necessarily have the claimed characteristics. However, there is absolutely no basis to believe that the particle collections in the Koksbang '880 patent have a uniformity disclosed and claimed by Applicants. The Koksbang '880 patent simply does not prima facie anticipate explicitly or inherently Applicants' invention in Group 4 claims.

#### Summary

The Examiner has failed to meet his burden of establishing prima facie unpatentability of Applicants' claimed invention based on the Koksbang '880 patent. Applicants respectfully request withdrawal of the rejection of claims 1-3, 6-9, 17 and 22-26 under 35 U.S.C. § 102(b), as anticipated by the Koksbang '880 patent.

#### B. REJECTIONS OVER KOKSBANG '214 - Second Ground of Rejection

The Examiner rejected claim 10 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,512,214 to Koksbang (the Koksbang '214 patent). Claim 10 is directed to a method for producing metal vanadium oxide particles using submicron vanadium oxide particles. The Examiner asserted that the Koksbang '214 patent discloses vanadium oxide particles with an average particle size less than a micron at column 5, lines 1-6. The Koksbang '214 patent, however, does not disclose submicron vanadium oxide particles. Based on well established case law, the Koksbang '214 patent does not prima facie anticipate Applicants' claimed invention. Applicants respectfully request reconsideration of the rejection based on the following analysis.

The Koksbang '214 patent is directed to the synthesis of vanadium pentoxide ( $V_2O_5$ ) and lithium vanadium oxide from the vanadium pentoxide. At column 5, lines 1-4 (emphasis added), the Koksbang '214 patent indicates that "vanadium oxide particles are formed having an average size less than 100 microns, desirably less than 50 microns and, preferably, less than 10 microns."

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The Koksbang '214 patent does **not** disclose an average particle size of **less than about 1 micron**, as disclosed and claimed by Applicants.

It is well established that a broader range is clearly not anticipated by a narrower range. Therefore, the Koksbang '214 patent simply does not anticipate Applicants' claimed invention. The Examiner has failed to establish a case of prima facie anticipation. Also, the Examiner has failed to assert any case for obviousness. Nevertheless, issues raised by the Examiner in phone interviews seem to relate to obviousness. Therefore, Applicants address the obviousness issue, although the Examiner has not formulated an obviousness argument.

In order to render a claimed process obvious, the cited references must place the claimed process in the hands of the public. The Koksbang '214 patent does not disclose how to form vanadium oxide particles with an average particle size less than a micron. The range disclosed in the Koksbang '214 patent is a **factor of ten** greater than Applicants' claimed particle sizes. The Examiner has not indicated how such a reduction in particle size can be performed. While the Koksbang '214 patent disclosed the desirability of having smaller average particle sizes, the Koksbang '214 patent does not indicate that particles can be formed with an average particle size less than a micron is achievable. This gap with respect to smaller vanadium oxide particles in the disclosure of the Koksbang '214 patent strongly suggests that Koksbang '214 patent does not enable a person of ordinary skill in the art to form submicron vanadium oxide particles.

In summary, the Koksbang '214 patent simply does not prima facie anticipate Applicants' claimed invention. The Examiner has not indicated any basis for establishing prima facie obviousness. Applicants do not have the burden to establish patentability, although Applicants' do not see any issues within the references of record that call patentability into question.

Since a prima case for anticipation or obviousness has not been established by the Examiner, Applicants respectfully request withdrawal of the rejection of claim 10 under 35 U.S.C. § 102(b) as being anticipated by the Koksbang '214 patent.

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Summary

Appellants' have presented clear evidence that the prior art does not place Applicants' claimed invention in the hands of the public. Since WO 00/38282 does not render Applicants' claimed invention *prima facie* obvious, Applicants respectfully request withdrawal of the rejection of claims 3, 6-10, 15 and 36-54 under 35 U.S.C. § 103(a) as obvious over WO 00/38282.

CONCLUSIONS AND REQUEST FOR RELIEF

Applicants submit that claims 1-3, 6-18 and 22-26 are in condition for allowance. Thus, Applicants respectfully request the reversal of the rejections of claims 1-3, 6-10, 17 and 22-26 and the allowance of claims 1-3, 6-18 and 22-26.

Respectfully submitted,



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## APPEALED CLAIMS APPENDIX

1. A collection of particles comprising metal vanadium oxide, the particles having an average diameter less than about 1 micron.
2. The collection of particles of claim 1 wherein the particles have an average diameter from about 5 nm to about 100 nm
3. The collection of particles of claim 1 wherein the particles have an average diameter from about 5 nm to about 50 nm.
6. The collection of particles of claim 1 wherein less than about 1 particle in  $10^6$  have a diameter greater than about four times the average diameter of the collection of particles.
7. The collection of particles of claim 1 wherein less than about 1 particle in  $10^6$  have a diameter greater than about two times the average diameter of the collection of particles.
8. The collection of particles of claim 1 wherein the collection of particles have a distribution of particle sizes such that at least about 95 percent of the particles have a diameter greater than about 40 percent of the average diameter and less than about 160 percent of the average diameter.
9. The collection of particles of claim 1 wherein the collection of particles have a distribution of particle sizes such that at least about 95 percent of the particles have a



diameter greater than about 60 percent of the average diameter and less than about 140 percent of the average diameter.

10. A method of producing particles of metal vanadium oxide comprising heating a mixture of vanadium oxide particles with a non-vanadium metal compound, the vanadium oxide particles having an average diameter less than about 1 micron.

17. A battery comprising a positive electrode having active particles comprising metal vanadium oxide within a binder, the active particles having an average diameter less than about 1 micron.

22. The battery of claim 17 wherein the positive electrode further comprises supplementary, electrically conductive particles.

23. The battery of claim 17 wherein less than about 1 active particle in  $10^6$  have a diameter greater than about four times the average diameter of the collection of active particles.

24. The collection of particles of claim 1 wherein the particles have an average diameter less than about 500 nm.

25. The method of claim 10 wherein the vanadium oxide particles having an average diameter less than about 500 nm.

26. The battery of claim 17 wherein the active particles have an average diameter less than about 500 nm.

## **EVIDENCE APPENDIX**

A - U.S. Patent 5,549,880 to Koksang